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Some Aspects of Anaerobic Infections of Animals*

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The considerable increase in our knowledge of diseases caused by anaerobic bacteria which has been acquired within the last twenty years has not only clarified our ideas as to the nature and causation of several of the more important of them but has led to the introduction of methods of control which have given most valuable results in practice. It would be impossible in a short address to do justice to the immense amount of excellent work which has led up to this and I propose to limit myself to some general considerations on the ecology of the causal bacteria and the circumstances in which they set up disease—these being of primary importance in determining the measures of control which are most likely to prove effective—and then to deal very briefly with a few of the particular diseases which presumably occur in this area. The term "anaerobic bacteria" is interpreted in its limited sense as denoting organisms of the Clostridium group.

Some members of the group have been clearly recognised as definite entities since early bacteriological times but great confusion existed as to the identity of others, the exact characters of which became clearly defined only as the result of careful work on the aetiology of gas-gangrene carried out during the last war. This opened the way to a more exact study of anaerobic infections of animals of which veterinary workers since that time have taken full advantage. These diseases still present, however, a variety of interesting problems, some of them of a very complex nature, the solution of which is needed to enable us fully to understand their pathology and perhaps to intervene more effectively in favour of the host.

We know that most of the Clostridia both pathogenic and non-pathogenic, are widely distributed in nature, some apparently more so than others, their natural habitat being the soil and the intestine of man and animals. Of the pathogenic varieties *Cl. welchii* is probably the most widely spread: indeed it is ubiquitous. Zeissler and Rassfeld found it in 100 per cent. of 200 soil specimens examined by them and it has been found with constancy in varying numbers in the faeces of practically all higher animals. Though the other types have not been demonstrated with anything like the same regularity in these situations they have been recovered from a varying percentage of samples of soil and faeces by numerous investigators and there is every reason to suppose that they are widely, if in some cases unequally distributed; probably they are often overlooked owing to paucity in numbers and to technical difficulties involved in their isolation. For example, while it may not be easy to isolate *Cl. septique* from the intestinal canal of healthy animals, the frequency with which it occurs there may be deduced from the well-known fact that it is a common and rapid *post-mortem* invader. Ruppert and Rottgardt found it in the gastric submucosa and in the blood of many normal slaughtered animals as early as six hours after death and in the bone marrow after ten hours.

Newsom, Cross and Dobbins examined spleens of 200 lambs some of which had been slaughtered and others of which had died of various causes, and recovered the organism from two out of 20 of those which were autopsied less than one hour after death. With a longer interval elapsing between death and examination the percentage of isolations increased, so that when it exceeded 12 hours more than half the spleens were found to contain the organism.

It may be noted here that many mistaken diagnoses have been made in the past through failure to appreciate the rapidity with which this organism may invade the tissues after death; this accounts, for example, for much of the confusion which has existed regarding the aetiology of blackleg in cattle and sheep. *Cl. welchii* is another organism frequently met with under similar circumstances: indeed most investigators in this country would probably agree that it is a more common *post-mortem* invader of sheep than *Cl. septique*.

None of the other pathogenic anaerobes is so obviously widely distributed as the two just named but it is well known that tetanus spores are very commonly present in soil, particularly that which is richly manured or grazed intensively by stock. Judging by the occurrence of cases of clinical blackquarter in animals it might be thought that *Cl. chauvaei* was largely confined to certain areas, but that this is probably a very doubtful criterion to apply is evident from the fact that braxy is also a disease of localised occurrence though the organism which causes it is nearly ubiquitous. Then again botulism seems to be a very rare disease in this country though Haines has recently drawn attention to the fact that *Cl. botulinum* is present in the soil here as Leighton and Buxton had previously shown it to be in Scotland.

There is no doubt that considerable multiplication of the various types occurs in the intestine from which they pass out to the soil and may persist there for long periods as spores. Different opinions have been expressed as to whether or not they multiply to any great extent outside the body but it is generally believed that their concentration in different soils is roughly proportional to the degree of faecal contamination. *Cl. botulinum* is possibly an exception to this rule as according to the extensive studies of Meyer and his collaborators, it has been found much more commonly in America in virgin soil of mountain and forest than in cultivated soil.

Generally speaking, then, we are dealing with a group of organisms which normally live a saprophytic existence in the alimentary canal of animals without causing any inconvenience to the host but which under certain conditions not yet properly understood are capable of producing rapidly fatal affections largely and in some cases entirely owing to their power to elaborate highly potent toxins which show definite affinities for one or more of the tissues of the body. The continued existence of the various species is in no way dependent on their playing a pathogenic role, the assumption of which appears to be entirely fortuitous so far as they are concerned. It is doubtful if any of them are capable of multiplying in tissue which is healthy; they do so only when it is damaged or actually necrosed. Some do not invade the tissue at all, *e.g.*, *Cl. botulinum* and the various *welchii* types responsible for enterotoxaemia. The former, as is well known, elaborates its toxin in food before it is ingested and the latter in the contents of the stomach and intestine. *Botulinum* toxin is absorbed through the normal mucous membrane but *welchii* toxin is not, and just how the membrane is injured to facilitate its passage in enterotoxaemia is not certainly known.

Cl. tetani has no invasive powers but if implanted into a wound will grow as a saprophyte and produce its toxin in any necrotic tissue which may be present there, but does not do so otherwise. In braxy, multiplication of the organism is very largely confined to the affected area in the wall of the stomach or occasionally intestine. This again is an area of necrosis the origin of which is still obscure, but presumably some initial tissue damage is necessary to allow the organism to become established following which the necrotising effect of the toxin would account for an extension of the local lesion. In man the association of gas-gangrene with tissue damage, especially extensive muscle damage, is very evident and the so-called malignant oedema is a common complication of wounds in our animals. Even in cases of blackleg where it is by no means always possible to demonstrate a wound which may have served as the point of entry of the causal organism, there is no reason to think that the pathogenesis of the disease is not to be explained on similar lines. It is known that spores which have been carried to the muscle from some small breach in the integument or have reached it after being taken into the body through one of the mucous membranes, can lie dormant there until some injury to the tissue occurs which produces the conditions required for their germination. Multiplication then proceeds rapidly, and leads to extensive necrosis at the site of the lesion resulting from the local action of the toxin produced There is massive invasion of the area affected followed by general intoxication and spread of the organism to other parts of the body.

Although we have a good general idea of the circumstances in which these anaerobic infections are likely to occur we have yet to acquire an exact knowledge of the factors which really underlie the onset of several of the most important of them. For example, the distribution of braxy is in itself sufficient to make one doubt the explanation usually given that chill, whether it be local or general, is the only factor involved. In lamb dysentery, too it is difficult to escape the conclusion that the association of the organism and the host is not the whole of the story. On the other hand, in the case of enterotoxaemia, which is often observed to affect animals which are well fed, Roberts was able to bring forward experimental evidence to support the general view that overeating is an important factor in its onset, and Turner has clearly

* Presented to the Eastern Counties Division, N.V.M.A., Ipswich, September 16th, 1943.

demonstrated the part played by the damage caused by the liver fluke in the aetiology of black disease, thus showing that anthelmintic measures afford alternative and supplementary means of control to specific immunisation although the latter is the method most often used in practice.

In lamziekte we have a very clear example of a disease which can be controlled much more easily by removing the predisposing cause, phosphorus deficiency, than by immunising the animals which are exposed to risk. In most anaerobic diseases no such alternative is available; and since we are powerless to prevent the very close association which normally exists between the bacteria concerned and the animal population we are bound to rely on immunisation. I think we may take it that effective sera and vaccines are available in practically all cases though their application is usually subject to economic considerations. In general vaccination is carried out in those cases where experience has shown that appreciable losses are liable to occur unless it is practised; otherwise reliance is placed on serum.

Malignant Oedema

Under this heading we may consider the well-known clinical condition analogous to gas-gangrene in man which arises as the result of the contamination of wounds by various species of Clostridia. It is seen in veterinary practice in horses following accidental wounds or surgical procedures, particularly castration; in cattle most frequently as a sequel to parturition—the so-called parturient gas-gangrene; in sheep after shearing, castration, docking, parturition, dog bites and other injuries. The condition is usually sporadic, but multiple cases may occur, especially in sheep after shearing and castration. It is well to remember that cases sometimes follow inoculation of common medicaments, particularly drugs which are tissue depressants, or of biological products including vaccines. Such an event can be very embarrassing as there is always a tendency to attribute the blame to carelessness in technique, or to bacterial contamination of the inoculum. Neither of these is necessarily to blame, however, since the trouble can arise from anaerobe spores which are lying dormant in the tissues until some material is injected which produces conditions suitable for their germination.

So far, gas-gangrene has not proved to be nearly as serious a problem in the present war as it was in 1914-18; this is attributable largely, though probably not entirely, to more ample provision of medical services and improved methods of wound treatment. A great deal of work is being carried out on the rapid identification of the types of anaerobes present in war wounds and on the relative value of specific antisera and the sulphonamide drugs in the control of gas-gangrene. Rapid diagnosis is very essential if specific treatment is to be administered before the infection has gone too far, and that is where we are often at a disadvantage when cases occur in our animals. We may note, however, that prompt surgical measures in the treatment of wounds are held to be of paramount importance in the prevention of gas-gangrene and that the local application of sulphonamides seems to be superior to oral administration. Furthermore, it has been shown that immunotherapy and chemotherapy can be combined with advantage and that together they give results much greater than the summation of their separate effects. This is what is known as synergism. As pointed out by Fleming, "the special function of these drugs is to inhibit the growth of sensitive bacteria but the actual destruction of the bacteria has to be carried out by the body. It seems clear, therefore, that the higher the state of immunity the better will be the apparent result of the drug." I mention these facts because there are undoubtedly occasions when they can be applied in veterinary practice although it is realised that such opportunities are not always present in the circumstances in which malignant oedema occurs in animals.

Tetanus

The only animal in which the control of tetanus is commonly undertaken is the horse, which is popularly—if, as I suspect, erroneously—regarded as the one which is most commonly attacked. Probably the greatest number of cases are seen in sheep, but here the average risk is generally considered to be too small from an economic standpoint to warrant immunisation. With the horse, however, it is otherwise and it is a common practice to administer serum to animals which have sustained wounds or are about to be operated on. Active immunisation is sometimes used but not nearly so frequently in civil life in this country as abroad where toxoid mixed with some substance, usually tapioca, to delay its absorption has gained a high reputation. Toxoid of high value is now readily obtainable and is best administered in two doses with an interval of at least a month; this may with advantage be followed by a third dose within a year. There are already indications that the comparative rarity of tetanus among wounded men in this war is attributable to immunisation carried out along these lines.

Blackleg

Vaccination against this disease is a firmly established policy though some of the older vaccines of doubtful immunising value have not been entirely discarded. It has been demonstrated repeatedly that formalin treated cultures of *Cl. chauvaei* consisting of dead or at any rate markedly inactivated bacteria, together with their products, are far better immunising agents than other types of vaccine and are, therefore, to be preferred.

Lamb Dysentery still causes a certain amount of loss in spite of effective prophylaxis being available. One supposes that this is due either to heedlessness or neglect on the part of the farmer, since it can hardly be ascribed to economic considerations. One knows of certain difficulties which have cropped up from time to time regarding the quality of the serum and that some brands on the market have been of low standard, but it is hoped that such deficiencies have now been rectified.

Mention of this disease recalls the fact that Montgomerie and Rowlands in this country and Mason in South Africa have reported that an analogous condition caused by the same organism occurs in foals, and it would be interesting to know if cases have been observed in this area.

Enterotoxaemia

All who have had experience of this disease are aware of certain complicating factors which tend to prevent the full or prompt application of control measures.

As it is very irregular in its incidence and morbidity the question of its control is usually regarded from a purely economic point of view. Particular farms may experience the disease only at rare intervals over a period of years and if the losses are not great a farmer may hesitate to incur the expense of treating a whole flock with serum. Prophylaxis by use of serum or vaccine is, therefore, regularly undertaken only in areas where annual losses are to be expected if it is not carried out. In this country we have so far relied mainly on serum, but in Australia and New Zealand vaccination on a considerable scale has been practised with results that appear to have been quite satisfactory. There is every possibility that vaccines of higher immunising value will be evolved in the future. Under certain conditions where lambs become affected with the disease quite early in life it has been shown to be possible to give them an immunity which is said to remain effective for up to six weeks by vaccinating the ewes during pregnancy in a manner analogous to that employed in the case of lamb dysentery.

The diagnosis of enterotoxaemia based on the history and clinical symptoms is not always reliable and errors are probably often made in both directions, deaths from pulpy-kidney disease being ascribed to some other cause and *vice versa*. The occurrence of sudden deaths in thriving lambs from three weeks old upwards or in fattening sheep is highly suspicious, especially if examination carried out shortly after death reveals a pulpy condition of the kidney together with lesions of toxaemia in other parts of the body, but no diagnostic significance should be attached to the mere presence of a softened condition of the kidney under other circumstances.

If a little urine can be obtained from the bladder it is useful to test it for the presence of sugar. This can be done in the field and if the result is positive it provides valuable supporting evidence for a diagnosis of pulpy-kidney disease and may save time in instituting prophylactic measures in the flock. Failure to detect sugar should not, however, be taken as evidence that the disease does not exist. For complete diagnosis laboratory procedures are required in order to demonstrate the presence of *Cl. welchii* Type D toxin in the contents of the alimentary tract. More than one animal may have to be examined before this is possible owing to the varying concentration of toxin which occurs there, and sometimes resort must be had to indirect methods involving the isolation and identification of the causal organism. This may take a few days to complete and so delay the application of control measures.

As the result of some interesting work recently published by Turner and Rodwell it should be possible, however, to carry it out with less delay in future. These authors have studied a phenomenon observed by Glover and myself some years ago when we found that *welchii* Type D toxin—or, to be more exact, the epsilon factor of it—becomes greatly enhanced in potency when exposed for a short time to the action of trypsin. They have shown that, contrary to the opinion which we then expressed, this effect is due to the conversion into toxin of a relatively atoxic precursor or prototoxin. This prototoxin is formed by the organism in the early stages of its growth in culture and becomes slowly converted into toxin on further incubation. The latter process can be rapidly accelerated by the addition of trypsin and hence there is no need to prolong the incubation for three or four days as has been deemed desirable hitherto.

The points which I have attempted to emphasise in this cursory review of the subject are: (i) anaerobic bacteria are widely distributed in nature in close association with the animal population,

(ii) normally they are not pathogenic and become so only as the result of secondary factors which predispose the host to their attack, (iii) as these determining factors cannot yet in most cases be controlled we rely mainly on immunisation as a means of prevention, and (iv) effective prophylactics are available for this purpose and should be fully used.

Discussion

Mr. MURPHY stated that in his district tetanus was more constantly occurring; the organism was considered a constant intestinal inhabitant in horses, and the disease was common in heavily manured districts. In deciding on serum treatment the economic side must be considered. He always used Pasteur antitoxin. Prophylactic treatment was usually recommended before docking but not before castration; could this be accounted for? He had observed canine cases, but had never cured one; the last case followed a grass seed in the foot—it was a common condition, but only in this case did tetanus develop. Serum treatment had been successful in cases in pigs. When in Worcestershire about 20 years ago, he remembered inoculating for blackleg, using blackleg oid, at the same time as animals were injected intratracheally for husk. He was some years in Essex before he observed a case; he had seen several cases since, and had relied on blackleg oid. It was usually the best animal that died from the disease. In the old days setoning through the dewlap was practised; could Professor Bosworth explain this? He had never discovered a wound by which infection could enter, but there might have been bruising; did the spore return to the Clostridium stage after reaching the bruised area, before toxins were formed? He had considered pulpy-kidney and enterotoxaemia synonymous, the former occurring in lambs and the latter in sheep. After death the kidneys of sheep decomposed rapidly, necessitating early *post-mortem* examination and diagnosis. Years ago, when knowledge of the disease was scanty and laboratory assistance non-existent, he had seen cases of braxy in Argyllshire. Then Gaiger commenced work on the subject. Flockmasters blamed the hoar-frost which caused a chill; there was some doubt whether the hoar-frost converted the grass to produce the abomasal inflammation or itself attacked the mucous membrane. Had Professor Bosworth any observations? Was the braxy vaccine used to-day the same as was used, say, 20 years ago? Malignant oedema was common in sheep districts following bites and shearing cuts. It was a common practice to smear shearing cuts immediately with Stockholm tar, but many cases were still observed which were beyond treatment. A recent case in a ram following a dog-bite he had treated with sulphanilamide, but it died within an hour.

Mr. MORTIMER requested details regarding the pathogenicity of the Clostridium Professor Bosworth was working on.

Mr. TURNER enquired how Clostridia gained access to bone marrow within ten hours of death.

Mr. WELCH recollected, when assistant to Messrs. Carless & Son, Stafford, in 1894, 120 calves were setoned 14 days after castration and none of them died.

Mr. SPELLMAN asked whether Clostridia were found throughout the carcase shortly after death, only when death was due to anaerobic infection. Where death occurred from other causes, whence came the exciting factor which caused Clostridia to develop?

Mr. POLLOCK reported a case considered to be enterotoxaemia due to *Cl. welchii* Type D. Lambs purchased annually, commenced to die about mid-September without noticeable symptoms or following profuse diarrhoea. *Post-mortem* examination revealed gas formation, lung congestion, epicardial petechiae, and some degree of pulpy-kidney; the mucosa of the rumen stripped off easily and the intestinal contents were fluid. As vaccine for this condition was still experimental, serum therapy producing an immunity for only three weeks was adopted, reinjecting with serum every three weeks, which was costly. Was the reinjection of serum at these intervals necessary? In acute cases of tetanus horses frequently died within 36 hours. He had one case recover spontaneously. He referred to a case of malignant oedema in a cow following calcium gluconate treatment for milk fever; he suspected infection via the needle which had been sterilised in spirit, but his client was satisfied it was due to bruising. Ligatures in operation for rupture were supposed to favour infection, but he had had no such experience.

The Reply

Professor BOSWORTH, replying, said he could only assume that prophylactic treatment against tetanus had been recommended before docking but not before castration because it had been thought the disease occurred more frequently after docking. One suggested explanation why the best animals contracted blackleg was that their muscles were well supplied with sugar, but there was no exact knowledge on the subject. Other examples of good condition, apparently predisposing to disease, had been observed in experiments on guinea-pigs and cattle with foot-and-mouth disease virus. It had been suggested that setoning lowered condition and permitted entry of small doses of organisms which produced a vaccinating effect, but it was doubtful if the procedure was of any value. When dormant spores were activated by bruising of tissues or other means, they changed to the vegetative stage before producing toxin. Undoubtedly an association existed between hoar-frost and braxy in affected districts but the disease was very partial in its distribution. The old explanation was that the intake of frosted food into the rumen had a local effect on the adjacent part of the abomasal wall. Some experimental work suggested the effect of cold was not local but general. Braxy vaccine used to-day was an improvement on that of 20 years ago. He could not yet indicate the pathogenic importance of the organism to which Mr. Mortimer referred. Mr. Turner would appreciate that as anaerobic bacteria in the intestine invaded the tissues after death, causing putrefaction, they might spread through the body with remarkable rapidity and occasionally reach the bone marrow within a very short time. The process was quite independent of whether death was due to anaerobic infection or not, and had to be considered in bacteriological diagnosis. Necrotic tissue favoured the growth of Clostridia as it provided conditions of anaerobiasis required for their multiplication. After death the body defences and oxygenation ceased, and the organisms were free to grow throughout the tissues. Serum would only protect lambs from enterotoxaemia for a short period. Vaccine was not generally used in this country and might be unobtainable commercially but he suggested enquiring whether a supply could be made available for trial purposes. Recovery from tetanus was not unknown even in man. Anaerobic infection following the injection of calcium gluconate might be explained by the knowledge that calcium salts act on tissues so as to encourage the growth of Clostridia. He deprecated the use of spirit for sterilisation and referred to an article in the *British Medical Journal* (January 20th, 1940).

According to the R.S.P.C.A., they have destroyed 650 unwanted dogs from Army camps, and Commanding Officers are required to see that any owners of dogs in their camps have paid the licence and that the animals have collars bearing names and addresses.

CLINICAL COMMUNICATION

Acetonaemia in Dairy Cattle

J. MACKAY, M.R.C.V.S.
COCKERMOUTH, CUMBERLAND

In this district there is a relatively high incidence of acetonaemia, which, while it may occur during any of the winter months, is most prevalent during the months of February and March. It is most common in high yielding cows which have recently calved and is found with equal frequency in Shorthorns, Friesians and Ayrshires.

It is characterised by the typical clinical symptoms, *viz.*, loss of appetite and condition, reduction in milk yield and typical odour of the breath. Nervous symptoms are also seen; these may range from slight inco-ordination of gait to inability on the part of the animal to rise. Like milk fever, which it often follows, it is most prevalent in high yielding cows and most commonly occurs from the third to fifth week after calving. Considering the nature of the disease one would have thought that the war-time diet, whereby imported nitrogenous cake is largely superseded by home-grown cereal, would have given an ample carbohydrate intake for the complete combustion of the fats but this is not so.

Treatment by injections of glucose, oral administration of sugars (treacle) and antacids gives only moderate success, whereas if conditions are suitable and the cow is turned out to grass the condition clears up in about four days and she returns to normal.

During the last two winters I have been treating acetonaemia with cod-liver oil and so far this has proved most successful. Treatment consists of daily dosage with half a pint of cod-liver oil. After three or four days the appetite returns, the odour disappears from the breath, the milk yield increases and the nervous symptoms disappear. During treatment stomachics (ammon. carb., nux vom., ginger) can with advantage be given. In cases which are apt to recur, twice weekly dosing with small quantities of cod-liver oil keep the condition in abeyance. In carrying out the above treatment care has to be taken to use a guaranteed brand of cod-liver oil.

From this it would seem that cod-liver oil contains some property necessary for the prevention of acetonaemia and I suggest that this property is its vitamin A content. Cows giving a heavy milk yield secrete a large amount of vitamin A in their milk and this is not replaced by the dry winter food nor is it synthesised when the cow is inside, with the result that there is a depletion of the system of vitamin A.

How vitamin A exercises its effect, whether directly on the liver metabolism or indirectly through the hormones, is a matter for biochemical determination.

KENYA'S £2,000,000 PLAN OF DEVELOPMENT

The Colonial Office announced recently that projects for development, with assistance from the United Kingdom involving an expenditure of some £2,000,000, have been worked out by the Government of Kenya, and these are already being examined in the Colonial Office. All except £500,000 of the sum involved, which would be a loan, would be in the form of grants under the Colonial Development and Welfare Act. The expenditure would be spread over several years.

The principal scheme is one for soil conservation, which would take £940,185. The next most important scheme is for the housing of Africans other than Government employees, which would cost £500,000. Altogether plans for African housing would cost £658,000. Another large sum involved is for water supplies, and other schemes include plans for agricultural and educational projects, re-afforestation, and the reclamation of tsetse fly areas.

In addition, the colony is now preparing a five-year construction programme, which would also cost about another £2,000,000, the main funds for which would probably be raised by loans by the Kenya Government. This programme would be chiefly concerned with increased school and hospital accommodation.

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CONTROL OF FOOD ADVERTISEMENTS

An Order in Council has been made controlling the labelling and advertising of foods. Under this Order (S.R. & O. 1943, No. 1553) it is an offence for a person to use a label or to publish an advertisement "which falsely describes that food or is otherwise calculated to mislead as to its nature, substance or quality or, in particular, as to its nutritional or dietary value." Power is also given to the Minister of Food to introduce regulations (*a*) for imposing requirements as to the labelling or marking of wrappers or containers enclosing or containing food of various kinds, and for restricting the making in advertisements of food of claims or suggestions of the presence in the food of vitamins or minerals; (*b*) for prohibiting or restricting the addition of any substance to, and regulating generally the composition of, any food.

ABSTRACTS

[Further Studies on Over-eating (Enterotoxaemia). Harshfield, G. G., Floyd Cross and Hoerlein, A. B. *Amer. J. vet. Res.* (1942.) **3**. 86.]

Previous work indicated sudden deaths among feedlot lambs receiving grain to be an enterotoxaemia due to *Cl. welchii* Type D infection. The authors now report successful attempts to increase the potency of the toxin produced by this organism in liquid medium, by means of pancreatin and filtrates prepared from intestinal contents of normal lambs. This did not follow the similar use of pepsin or filtrates of abomasal contents of normal lambs. Further work indicated clearly that *Cl. welchii* Type D toxin causes a considerable hyperglycaemia before death, thus explaining the glycosuria frequently noted in field cases. The authors were also successful in three cases out of eight in establishing typical enterotoxaemia in susceptible lambs by feeding cultures of *Cl welchii* Type D in conjunction with a large feed of grain or milk.

W. T. R.

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[The Anthelmintic Efficiency of Phenothiazine against Immature *Trichostrongylus* spp. in sheep. Gordon, H. McL. (1943.) *J. Coun. Sci. Industr. Res.* **16**. 1-4.]

Gordon dosed each of 30 worm-free sheep, about 5 months old, with 24,000 larvae of species of the genus *Trichostrongylus* which inhabit the duodenum, chiefly *T. colubriformis*. Ten days later, ten of the sheep were each given 10 grammes phenothiazine five by injection into the abomasum, five by injection into the rumen. Five days later, or 15 days after the larvae were administered, another ten sheep were each given 10 grammes phenothiazine, six by injection into the abomasum and four by injection into the rumen. The remaining ten sheep served as controls. Faecal egg counts on each animal were begun 21 days after the dose of larvae and were repeated usually daily, until the 35th day. An analysis of the data obtained showed that mean counts of 1,700, 1,900 and 3,600 eggs per gramme resulted from sheep treated ten and 15 days after infestation and from controls, respectively. The author concludes that phenothiazine is considerably less efficient in killing immature *Trichostrongylus* spp. than in killing the mature parasites and points out that under active outbreak conditions where continuous reinfestation is taking place, treatments must be repeated at intervals not exceeding ten to 15 days if a rapid resolution of the outbreak is to be achieved.

J. N. O.

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[Control of the Hog-Kidney Worm (*Stephanurus dentatus*). Threlkeld, W. L., and Johnson, E. P. (1942.) *Amer. J. vet. Res.* **3**. 72-76.]

Threlkeld and Johnson state that the complicated system of pig management designed by the U.S. Bureau of Animal Industry to prevent infestation with *Stephanurus dentatus* in Georgia, is impracticable in the "peanut section" of Virginia where pig raisers make a practice of turning out their swine on peanut fields after the crop has been harvested. The authors tried to modify this B.A.I. system, but the results obtained did not appear to justify the extra expense and labour involved. Daily doses of 0·5 to 1 gramme of phenothiazine over a period of five months also failed to cure the disease; so did a single dose of 20 grammes. The authors mention that very little, if any, phenothiazine or its effective oxidation products are absorbed by the blood and reach the larvae *via* the blood stream. They suggest as a result of laboratory experiments, that phenothiazine, given to the sow in repeated doses during the period the pigs are with her, or sprinkled about the feeding troughs, houses and places where the sow most frequently urinates, may be useful in preventing the development of the worm eggs. Laboratory experimental results were sufficiently encouraging to warrant field experiments to determine their practical value.

J. N. O.

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[Active Immunisation of Dogs against Leptospirosis by the Use of Formalised Leptospiral Antigen. Alicata, J. E. (1943.) *J. Amer. vet. med. Ass.* **102**. 472-473. (4 refs.).]

Two dogs were inoculated with several doses of 10-day-old cultures of *L. canicola* grown on Schüffner's modification of Verwoort's medium to which 0·2 per cent. formalin had been added and three dogs were immunised in a similar way with *L. icterohaemorrhagiae*. None of these dogs suffered adversely from the treatment and the sera of all developed agglutinins. Serum from one of these dogs was mixed with live extract from a guinea-pig dead of lentospiral jaundice and serum from another with virulent culture. Guinea-pigs injected with these mixtures were protected while similar control animals died of leptospirosis. One of the dogs immunised against *L. canicola* resisted infection with a liver extract of a guinea-pig which had been experimentally infected with *L. icterohaemorrhagiae*.

A. W. G.

REPORT

[Hannah Dairy Research Institute: Report for the Two Years ending March 31st, 1943.]

The report is of a more general nature than usual, but it is clear that the work of the Institute continues to be concentrated on problems of milk production which are likely to have early results and will be directly applicable to this important national matter. In this respect the selection of a suitable cropping policy most likely to achieve the milk target is receiving considerable attention.

Although silage crops have been encouraged as a means of protein preservation it is possible that these may, for various reasons, fail, and under these conditions a protein substitute should be available. Beans could well fill in this gap and the best methods of cultivating them are under investigation. In addition, synthetic nitrogen compounds such as urea may be valuable where the protein supply is short. It has already been shown that urea does not depress milk yield and that 75 per cent. is utilised by the animal. It would seem that micro-organisms are intimately related to the process of urea breakdown and that the presence of starch is beneficial to its fullest utilisation.

The conservation of grass and green fodder has been dealt with fully in Bulletin No. 8 of the Institute and already noted in this journal. This is only one of the foodstuffs the storage of which is receiving attention. Moulds, which are the most likely cause of deterioration, have a remarkable viability, remaining quiescent for long periods despite the presence of preservatives.

Work in connection with the bacteriology of milk products dried respectively by the roller and spray methods has been continued with special reference to the conserving qualities of the final product.

On the disease side, mastitis has received full attention, the most significant work in this connection relating to the influence of different types of milking machines. Observations on two groups of herds using two different types of milking machines revealed an average of 14 per cent. infection in the one group as compared with 49 per cent. in the other group.

N. S. B.

IN PARLIAMENT

Lords Debate Food Values and Farming Methods

In the House of Lords on October 26th Lord Teviot called attention to food values in relation to agricultural methods in view of their importance to the health of man, animal and plant. No one, he said, who was connected with agriculture could be other than perturbed at the number of diseases among our farm stocks, while the diseases among crops were legion. The object behind his motion was to see that we put planning for the health of our people, animals, plants and crops first. While the spirit of our people was magnificent and their courage undaunted, their bodily conditions were bad. A report from the B.M.A. summed up the whole situation in this way: "While hundreds of millions are expended in trying to cure, only one-fifth of 1 per cent. of the national expenditure goes on research to find out, not how to cure, but how to prevent." He was entirely in agreement with a balanced diet, but unless the components came from a healthy soil rich in humus there would be a deficiency of life-giving, disease-resisting properties. We had a sort of cycle—a healthy soil, a healthy plant, a healthy animal and then a healthy man—and it was the integrity of that life-circle which was so important. We must plan to put back into the soil those things which we took from it. A council of nutrition was suggested some time ago. He hoped it would be set up and that it would take into serious consideration not what we should all eat but whence it came and how it was cultivated. He begged for a Royal Commission or a committee of enquiry in order to combat the present tragic state of affairs.

Destruction of Fertility

The Earl of Portsmouth said very few doctors would advise their patients continuously to use strong antiseptic nasal sprays; if they did the living membranes would suffer and have no power left of resistance to disease. We were doing exactly that to the soil. With lethal sprays we were destroying the soil's power of resistance, and at the same time were giving continuous doses of chemical food and chemical stimulants so that the infinite complex of bacterial life in the soil was being upset. We were upsetting the vitamin content—that was, the capacity of the soil to produce food—by destroying the humus within the soil itself.

Lord Geddes pointed out that in Prince Edward Island there was a very high standard of health, an extraordinarily vigorous active population, and, quite remarkably after 50 years of close examination no fall whatever in the birth-rate. The population

there drew their fresh food from the sea and from the field in the traditional manner, living on simple foodstuffs and the products of their own farms and fishing.

Northern Rhodesia, which had been depopulated by disease, was not an easy country to get people of another race into, and to keep them there in a good state of health. They had given the people food grown on rich humus soil with plenty of life in it. In the result they had beaten back disease and turned that part of Northern Rhodesia into what was a health resort. The positive health of these people was based on food. He supported Lord Teviot's plea for some work to be done in this country to follow up the work now being done in Canada.

Viscount Bledisloe pressed strongly on the Government that the time had come when there ought to be research: research not merely conducted in watertight compartments—the health of plants, the health of animals, and the health of human beings—but comparative research on the important problem of the interrelation between the morbid conditions of soil, plants, animals and human beings. Very valuable research was being done to-day in New Zealand on diseases of animals and fish. What the doctors did not know, however, was the relation, if any, between the deficiencies in the animals and several mysterious morbid conditions of the human population of New Zealand. Everywhere doctors were very anxious that research should be instituted into the subject. After a recent debate in the House of Lords he asked some agricultural experts whether phosphate deficiency of pastures was transmitted to the milk of cows fed on those pastures, and if so what effect it had on human beings. There was, however, no knowledge in this country on that subject to-day.

Effect of Fertilisers

The Duke of Norfolk, replying to the debate, deprecated any suggestion of antagonism between chemical fertilisers and humus. There was no evidence whatever, from farming or medical experience, or from the scientists, that the proper and balanced use of fertilisers had any harmful effect on the soil, on the health of crops, or on men. Sir Daniel Hall had said that disease was not a product of modern high farming with chemicals, though it might be the mark of their use in an ignorant manner. So far as this country was concerned our safeguard lay, as ever, in the sound principles of mixed farming. The Ministry of Health was not aware of any medical evidence in support of the view that food produced from soil which had been fertilised by artificial manures was in some cases dangerous to health. The value of a certain amount of humus was beyond all argument, and he thought it might be a mistake if this question were raised to so high a level as the realm of political controversy. He would bring Lord Teviot's request for an enquiry or a Royal Commission to the notice of the Minister of Agriculture and the Ministries of Health and of Food.

Questions in the Commons

BOVINE TUBERCULOSIS

Mr. A. Edwards asked the Minister of Health whether any death certificates are received in which the cause of death is given as from bovine tuberculosis?

Mr. E. Brown: Bovine tuberculosis can only be distinguished with certainty from other forms by special laboratory procedure and in future medical practitioners certifying deaths from this disease in which such tests have been carried out will be asked to indicate this fact. So far as is known no such distinction has been made in any certification.

MILK PRODUCTION (LOCAL AUTHORITIES' POWERS)

Sir A. Maitland asked the Minister of Agriculture what adverse criticism has been submitted in regard to the proposals in Command Paper 6454, dealing with alterations to the milk and dairies administration; and whether he has considered representations that many local authorities having existing officers could efficiently discharge the necessary duties without the appointing of additional officers?

Mr. Hudson: I have received and considered a number of representations from local authorities against the proposed transfer to my Department of their powers relating to milk production on the farm, including certain representations in the sense indicated in the second part of the Question.

LIVESTOCK (QUALITY)

Colonel Carver asked the Minister of Agriculture whether the war and its effects have produced any deterioration in the quality of our livestock?

Mr. Hudson: No, Sir.

Colonel Carver: Is there not a considerable falling off of our herd book entries, and will my right hon. Friend see that British livestock does not lose its place as being the best in the world?

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 20th.—Second Annual General Meeting of the Society of Women Veterinary Surgeons, at the Conway Hall, Red Lion Square, London, W.C.1, 1.30 p.m.

Nov. 25th.—Meeting of the South-Eastern Division, N.V.M.A., at Maidstone, 2 p.m.

Nov. 25th.—Meeting of the Lancashire Division, N.V.M.A., at Liverpool, 2.30 p.m.

Nov. 25th.—Meeting of the Central Veterinary Society at the Conway Hall, W.C.1, 2 p.m.

Nov. 26th.—Meeting of the Royal Counties Division, N.V.M.A., at Reading, 2.30 p.m.

Dec. 1st.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

Dec. 15th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 2 p.m.

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PERSONAL

Appointments.—Announcement is made of the following first appointments in the Colonial Veterinary Service: Messrs. M. J. Fitzpatrick, M.R.C.V.S., as Veterinary Research Officer, Kenya; G. Q. Fowler, M.R.C.V.S., as Veterinary Officer, Nyasaland and P. D. L. Guilbride, M.R.C.V.S., as Veterinary Officer, Northern Rhodesia.

Forthcoming Marriage.—Fletcher—Reeve.—The engagement is announced between Frank Keith Fletcher, M.R.C.V.S., son of Mr. and Mrs. F. H. Fletcher, of Cricklewood, N.W.2, and Joan Mary Reeve, daughter of the late Mr. F. H. Reeve and of Mrs. Reeve, Q.A.I.M.N.S.R., M.E.F.

Will.—Sir James Joseph Ralph Jackson, M.R.C.V.S., of Roefield, Meadfort Road, Torquay, late Chief Veterinary Officer, Ministry of Agriculture, who died in August, aged 71 years, left £7,796 15s. gross (net £5,537 2s. 11d.).

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R.C.V.S. OBITUARY

Matthews, Geoffrey Tom, Superintending Inspector, Animal Health Division, Ministry of Agriculture. Graduated London December 21st, 1906. Died November 13th, 1943.

MR. G. T. MATTHEWS, M.R.C.V.S.

The death of Mr. Geoffrey T. Matthews, following an operation, will be much regretted by the profession and the agricultural community, and with a deep sense of personal loss by his colleagues of the Animal Health Division of the Ministry. Prior to his transfer to the Headquarters Staff, Mr. Geoffrey Matthews was Superintending Inspector in the field in the Eastern Counties Area, and was a valued member of the Eastern Counties Division N.V.M.A. We hope to publish a further notice in our next issue.

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R.C.V.S. ANIMAL MANAGEMENT EXAMINATION

LIST OF SUCCESSFUL CANDIDATES

Dublin:

Adams, E. K.
Casserly, P.
Devereux, J. A.
Dineen, J.
Dodd, L.
Farrell, J.
Ferguson, Miss M. D. R.
Forde, L. P. (credit)
Greenwood, J. J.
Higgins, J. P.
Hutchinson, R. W.
Martin, H.
Monaghan, D. H.
McNamara, E. J. (credit)
McNeill, John
Nicholson, J. T.
O'Brien, C.
O'Gorman, D. (credit)
O'Scanaill, T.
Prendergast, W. J. N.
Ryan, P. I.
Shiel, J. C.

Glasgow:

Bremner, D. A. T.
Campbell, A. D.
Garven, James (credit)
Grossett, A. B.
Lawson, D. D.
McCracken, David (credit)
MacDonald, Miss E. F.
Mancair, A. J.
Pfaff, H. W.
Urquhart, G. M. (credit)

Liverpool:

Green, L. H.

Edinburgh:

Bottomley, P. J.	Marr, Alfred
Braithwaite, J. R.	Mather, D. B.
Buie, Andrew	Olivant, J. M.
Chadwick, I. M.	Paterson, J. D.
Duncan, J. M.	Smith, J. H. C.
Dyce, K. M.	Wharton, M. H.
Hogg, Anthony	Wight, P. A. L.
Horrox, M. A.	Wilson, J. C.
Jordan, W. J.	Wilson, J. M.

Reading:

Birkbeck, Miss M. C.	Ornbo, Miss M. A.
Brown, B. B.	Pitman, K. J.
Brown, D. H. W.	Richards, Miss Betty
Calderbank, George (credit)	Roberts, H. E.
Colley, A. H. J.	Schwabacher, E. N.
Cook, E. R.	Smith, Miss A. G. (credit)
Darbishire, H. B.	Startup, F. G.
Deans, D. H.	Sykes, C. W. A.
Delfosse, Miss M. M. (credit)	Thomsett, L. R. (credit)
Harries, J. A. J.	Trawford, F. R.
Henderson, J. F.	Troughton, Miss S. E.
Hirst, B. J.	Warren, A. G.
Humphries, P. N.	Wells, E. A.
Lloyd, J. R.	White, J. A.
Miller, E. R.	Young, Michael

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BLOODSTOCK INDUSTRY'S SUPPORT FOR THE VETERINARY EDUCATIONAL TRUST

At a luncheon held recently to consider how best the bloodstock industry could further the aims of the Veterinary Educational Trust, the hosts being Major G. H. Deane and Mr. Robert Needham, the former, in his introductory remarks, said that inasmuch as in this country we had the best bloodstock and livestock the world produces, we needed the finest veterinary service in the world. In the achievement of this aim the Veterinary Educational Trust had an important part to play as would be found when the Trust had secured adequate funds and was in a position to put into active practice the programme that had been outlined. Up to the present veterinary science had had little or no endowment from private benefactions. There was as yet no Beit Memorial, no Nuffield Trust, no Rockefeller Foundation devoted to the advancement of veterinary science. Medicine and surgery and the other sciences had been so well favoured in the distant and immediate past that the time had come for veterinary science to receive its long overdue recognition and support.

Mr. Needham drew attention to the recent statement by the Minister of Agriculture in which he forecast a substantial increase in the herds of cattle in this country after the war. "With regard to bloodstock," continued Mr. Needham, "I should like to give you some facts in connection with the General Stud Book. There are, in the last volume, approximately 9,700 brood mares, and owing to the war a very considerable reduction has taken place. Some 3,200 have died or been destroyed; about 500 sent abroad; about 700 have been put out of studs for various reasons; and 300 are 20 years old or more, leaving a balance to carry on of approximately 5,000—and these figures are only made up to December 31st, 1942. As our herds of cattle are to be increased, so our thoroughbreds must be built up again to supply requirements of pedigree stock all over the world. The veterinary profession has been hard put to it in the past to cope with the various branches of stock, and now it is of paramount importance that the profession should be sufficiently endowed to enable it to carry out the necessary attention and research to keep our bloodstock, as it is to-day, the best in the world." The Duke of Norfolk (President of the Trust) spoke of the urgent need for improved facilities in veterinary education, and the Duke of Beaufort (Hon. Treasurer) stated that the Trust Fund had now reached £100,000, and he hoped that the support of the bloodstock industry would carry it on the way to the £1,000,000, which was the present objective.

A discussion took place as to the best methods of securing support for the Trust, and the following committee was elected with power to add to its number: Major Durham Matthews (Chairman) Sir Humphrey de Trafford (Vice-Chairman), the Earl of Sefton (Hon. Treasurer), Major Gerald Deane and Mr. Robert Needham (Hon. Secretaries), Mrs. Morriss, Miss Yule, Mr. Martin H. Benson, Major Harold Cayzer, Lord Willoughby de Broke, Mr. E. Thornton-Smith, Mr. J. A. Hirst and Lt.-Col. B. Hornung. The first meeting of the Committee was held in the Jockey Club Rooms, Newmarket on October 19th, and plans were made for securing support for the Trust. Although no formal appeal had been made, over £2,000 had already been contributed. It was resolved to add to the Committee by asking for a representative to be appointed by each Trainers' Federation and by the Victoria Club. Mr. E. Brayley Reynolds, M.R.C.V.S., Newmarket, was invited to join the Committee. Lists of subscribers to the Committee's appeal will be issued from time to time.

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MILK BILL FOR NORTHERN IRELAND

The Government's White Paper on "Measures to Improve the Quality of the Nation's Milk Supply" in which certain proposals were outlined for the milk supply in Great Britain, did not apply to Northern Ireland, but a Milk Bill is now before the Parliament of Northern Ireland and a memorandum explaining it has been issued by the Ministry of Agriculture. In the memorandum the Northern Ireland Government state that "increased consumption at home and the shipment of liquid milk to Great Britain" render it "most important that we should maintain our position in regard to our milk supply."

During the past year seven liquid milk depots of the most up-to-date type have been erected at various centres, and the Government is thus in a favourable position to supply pasteurised milk. At first the scheme will be applied to Belfast area only.

The Bill will require all milk sold in that area to be:

(1) Grade A from tuberculin-tested herds;

(2) Grade B from cows of a single herd which have been subjected to a clinical examination by the Ministry's veterinary officers; and

(3) Pasteurised milk.

At the outset the two grades named will be exceptions to the pasteurisation policy.

Liquid milk consumption in Northern Ireland has increased by almost 100 per cent. since the war. It was 29,000 000 gallons last year.

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MINISTER OF RECONSTRUCTION

The outstanding appointment in the Ministerial changes recently announced is that of Lord Woolton to be Minister of Reconstruction. For the first time in the present Government a Minister has been given full authority to deal with all aspects of post-war reconstruction policy, with a seat in the War Cabinet to confer the status necessary for this high task. Lord Woolton has been a most resourceful and successful Minister of Food, and in the new responsibilities which he is undertaking he will have the goodwill of everyone.

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AGRICULTURE'S AID FOR THE RED CROSS

Lord Iliffe, Chairman of the Duke of Gloucester's Red Cross and St. John Appeal, has received a cheque for £500,000 from Mr. R. W. Haddon, Chairman of the Agriculture Fund. This brings the total raised by those who live on or by the land to £3,000,000, which is actually three times the amount raised from the same source during the last war. The third million took only six and a half months to raise, compared with ten months for the second million, and two years and five months for the first.

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EXPANSION OF THE PIG CLUB MOVEMENT

Returns collected from pig clubs indicate that they are producing something like 7,000 tons of pigmeat a year, largely on waste food. This was announced by Mr. Cedric Drewe, M.P., Chairman of Small Pig Keepers' Council at the annual meeting of the Council in London.

The Council's report presented at the meeting revealed that on June 30th, 5,090 clubs had been formed and registered since the Council launched its campaign in May, 1940, and that after allowing for clubs which had ceased to exist or were temporarily inactive 120,000 pigs were being fed by 110,000 members. Thirty-one per cent. of the clubs were for individual owners and 69 per cent. co-operative clubs.

Commenting on the expansion reflected in these figures, the Agricultural Correspondent of *The Times* observes: "The growth of pig clubs has stimulated the market demand for store pigs at a time when the numbers of breeding sows in the country have been greatly reduced. Many farmers could now profitably keep one or two sows with the idea of selling the young pigs when they are 10 to 12 weeks old. They have some by-products such as tail corn and chat potatoes which can be turned to good use in this way. A special allowance of 3 cwt. of meal is now made for farrowing sows under the feeding-stuffs rationing scheme. While there will not be any big increase in pig breeding during the war, when no imported barley or maize is available for pigs and all home-grown grain is wanted for human consumption or for feeding to dairy cows, there is certain to be a rapid expansion afterwards.

Licensing of Boars

"Preparing for this, breeders have urged the Ministry of Agriculture to go ahead now with the introduction of boar licensing. It would be a great pity if nondescript boars of poor type were freely used after the war in the expansion of the pig industry. This country has long had a name for breeding good pigs for both bacon

and pork. The Scandinavian countries drew freely on our pedigree herds in establishing the excellent breeding stocks they had before the war. They were chiefly interested in bacon production for export, and the creation of the Pigs Marketing Board in this country stimulated specialised bacon production here. At the same time there were a great many pigs about the country which were not economical to feed, and which did not produce a carcase ideal for any purpose.

"In the early stages the licensing of boars, like the licensing of bulls, would do more than prevent the use for breeding of thoroughly unsuitable sires. It must always be left to the individual to decide what type of pig he wants to breed, provided that he has a definite aim. But there are some who need to be saved from their own indifference, and there will no doubt be newcomers to pig breeding after the war who should be saved from the pitfalls that await the inexperienced."

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POST-WAR HORSE AND PONY REQUIREMENTS

In a recent publication issued jointly by the National Horse Association of Great Britain and the National Pony Society we are reminded that while mechanised aids to agriculture will no doubt be used as one method of starting agriculture again in Europe, it cannot be too strongly emphasised that much of Europe is a land of small fields and small farms, and in many parts consists of hilly and even mountainous land. Here the horse and the useful cob and pony will be required in very large numbers. Where are they to come from?

The Director for Foreign Relief and Rehabilitations Operations U.S.A.—Mr. Herbert Lehman—speaking on June 17th in New York, is quoted as speaking of this problem as one of many which would face the United Nations after the war in bringing relief to the liberated countries of Europe and Asia. He said: "Horses are disappearing at such a rate that scarcity of draught animals may be a problem even more acute than the scarcity of man-power in the first harvest of peace. The occupied countries have been systematically drained of their resources and never before has the world witnessed so ruthless a spoliation of so many in so short a time." The Technical Advisory Committee on Agriculture in London in a recent report, it is added, estimated that the decline of horses in Europe was three million, but it is apparent that this is a very conservative estimation when the position is gone into thoroughly. The total loss in horse power is colossal. Losses in horses and ponies are due not only to actual war and confiscation, but also to the cessation of breeding, and to the great slaughter of horses and ponies to provide meat for the population, or to prevent them from falling into the hands of the enemy. Thousands have also been destroyed because of the lack of animal foodstuffs.

In this brochure (obtainable from 35 Wymond Street, Putney, S.W.15) the position in each European country has been reviewed, and an estimate made of the loss, compared with the figures of the last census available. The total estimated loss as given comes to the colossal figure of 9,915,000, or excluding the estimated losses of Russia, to seven million horses. The four neutral countries, Portugal (90,330 horses), Spain (500,000) Sweden (620,000) and Switzerland (139,492) horses) have but few horses, and in Spain and Portugal there was prior to the war an acute shortage, and the signs were that they intended to come to this country to secure good breeding strains.

"It is obvious that immediately after the war there will be a tremendous demand for horses and ponies, and this country as the home of pure-bred animals will have to take a leading part in fulfilling this requirement. Despite the difficulties of breeding at the present juncture, owners are urged to breed from all their high-class pedigreed horses and ponies, as apart from the fact that registered stock will always command higher prices, breeders surely have a responsibility to future generations to maintain the continuity of the pedigrees of the various breeds, which have been established in this country with so much forethought and expense in the past."

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STALLION FEES

"Although there has been a great advance during the war in the price of all kinds of heavy horses—foals, unbroken geldings and fillies, and mature work animals—this has not been accompanied by any great advance in stallion fees," says *The Scottish Farmer*, and continues: "About two years ago the Department of Agriculture for Scotland, which had ceased giving any assistance for heavy horse breeding in 1931 again offered grants on a limited scale for this purpose. These take the form of a direct grant of £40 to a duly constituted horse breeding society subject to a maximum service fee of £2 10s.; and under certain conditions a further grant not exceeding £30 may be given for the assistance of small farmers in the area of the society. These increased fees, if they meet the increased costs of the stallion owners, certainly do no more. In England and Wales the Ministry of Agriculture has been giving grants of a similar nature—£40 per stallion. One of the Ministry's regulations was that the inclusive hiring fee for a stallion in respect of which such a grant was made must not exceed 400 guineas, and the service fee must not exceed 4 guineas. It is now announced that the Ministry has amended the scheme by raising the maximum inclusive hiring fee from 400 guineas to 500 guineas, and the maximum service fee from 4 guineas to 5 guineas. It should be mentioned that this service fee includes foal money as well, whereas in Scotland only the service fee is mentioned and no word of foal money."

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MINISTRY OF AGRICULTURE NEWS SERVICE

Straw Pulp for All Stock.—About 2,000 straw pulp process plants are now in use on farms in England and Wales. Reports received from their users show that they have been successful and that the production of straw pulp can be encouraged for use with all classes of stock and need not be restricted to dairy cows. Experience has proved that chopping is unnecessary, and it is safe to assume that lack of machinery for this purpose need not prevent the installation of a plant. Labour requirements are, therefore, much reduced. A straw pulp plant, together with full knowledge of the process, is an insurance against a difficult winter and food shortage; it is also a preparation against the time when it may be essential to increase the head of all classes of cattle and sheep in the country. The use of pulp makes it possible to reduce the acreage of mangolds or swedes, so releasing the land for other cleaning crops such as potatoes or sugar beet for human consumption.

Rubbish Sold as Feeding-stuffs.—There is a good deal of rubbish on sale as "unrationed feeding-stuffs." Stock keepers, particularly those maintaining rabbits, pigs and poultry on a small scale; should avoid indiscriminate buying from street stalls and unknown merchants. Following a number of complaints received, the Ministry of Agriculture analysed many of these "off the ration" goods. Sawdust, floor sweepings, wood shavings, salvaged and badly charred grain and other similar material have been found to form the basis of the "food." It is, however, possible that from time to time small quantities of good unrationed feeding-stuffs may be available, but the safest plan is to buy only from a reputable dealer.

Farm Pigs.—Every extra pig for bacon means a year's ration for nine people and a corresponding saving in shipping space. Yet more than half the farms in this country are without pigs and only one-fifth of them carrying a breeding sow. Pigs on the farm mean more work, but in war-time they play a great part in contributing towards the national larder and help to maintain fertility of the soil. Special rations are now available for farrowing sows at the rate of 3 cwt. per sow. This is double the previous allowance and the increase is for feeding to young pigs from weaning to four months old, after which age they need little food other than swill, chat potatoes and edible waste products. On many farms potential bacon is being thrown away for lack of pigs to consume farm waste produce.

Feeding Oat Straw.—Of the cereal straws, oat shows the highest feeding value. Good clean oat straw should not be fed indiscriminately, but used as if it were hay—oat straw is often preferred by animals to poor hay.

When substituting this feed for hay it is useful to remember that 1 lb. of oat straw together with 2 lb. of marrow-stem kale, will replace 1 lb. of meadow hay and provide the same protein and starch equivalent. If marrow-stem kale is not included, then the amount of straw must be increased to 2 lb. and some extra protein food will be needed. Another useful ration comparison is 7 lb. of oat straw with 7 lb. of brewer's wet grains contain as much starch equivalent and digestible protein as 7 to 8 lb. of meadow hay. It is a common practice to chaff oat straw for feeding, but if it is the only coarse fodder in the ration, part of it should be fed long so that rumination may be assisted. Oat straw should not be fed to high yielding cows, since it is bulky in relation to its food value, but it can be included in the ration for low yielders and for fattening bullocks.

"Pulp" Weedy Chaff and Cavings.—Experiments have been carried out at the National Institute for Research in Dairying, Reading, to discover whether the ordinary farm process for making straw pulp from cereal chaff and cavings kills the weed seed that such material is likely to contain. It was found that a soaking in a 1·5 per cent. solution of caustic soda gave a 100 per cent. kill of common poppy and charlock, provided the charlock was not in husk. Yorkshire fog, wild carrot and narrow-leaved plantain registered between 94 and 87 per cent., wild oats 84. Spurrey, yarrow and broadleaved dock, however, were only killed to the extent of 41 and 18 per cent. The conclusion was that many seeds, especially those with soft coats, were directly destroyed by the straw pulp process, and that thick husks are so softened as to be

subsequently digested by the animal. If weedy chaff and cavings are converted into straw pulp instead of being used as bedding or for liberal feedings, large scale infection of the land by weeds seeds from farmyard manure will be largely prevented.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net	Post free
	s. d.	s. d.
Statutory Rules and Orders, 1943:		
1460. Diseases of Animals. Transit of Horses, Asses and Mules Order, October 11th ...	0 1	0 2
Agriculture and Fisheries, Ministry of:		
Growmore Bulletin 8. Substitute Feeding-stuffs (by J. Duckworth, B.S.A., D.S.C.) ...	0 3	0 4
Command Papers:		
The Labelling and Advertising of Goods ...	0 1	0 2

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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VETERINARY EDUCATION: THE "ONE-PORTAL SYSTEM"

Sir,—As I understand it, Coleman, who took over the Royal Veterinary College at the death of St. Bel towards the end of the 18th century, was of the opinion that medical attention of animals was no difficult matter and could be quite efficiently carried out by any man who was competent to handle animals, after quite a short technical training, and the profession is still labouring under this cloud.

In 1844 the promoters of the First Charter stated they were of the opinion that the medical treatment of animals was quite as skilled as the medical treatment of mankind, but that it was of a highly specialised character, and the only persons capable of determining the technical training required, and the degree of competency to be shown by students at examinations, were the actual members of the profession.

The Government of the day agreed with this view, the necessary charter was granted, and this was the origin of the "One-Portal System."

The question now under consideration appears to be whether this opinion still holds good, that is, whether the members of the profession are still the only persons qualified to decide the training and examination of future veterinary surgeons and whether, if any outside authorities, such as the governing bodies of universities, were to take over the training of veterinary students, the quality of the services rendered by the veterinary profession would be jeopardised.

I feel sure we should all appreciate some clear guidance on this point from senior members of the profession.

Yours faithfully,

The Wool House, A. J. Beeson.
Loose,
Maidstone, Kent.
November 3rd, 1943.

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RACEHORSE BREEDING: THE QUESTION WHETHER CHANGE IS NOW DEMANDED IN THE OFFICIAL FOALING REGISTRATION DATE

Sir,—Horse racing has been suspended during the war though it has not been allowed to lapse. There is at the moment an increased interest in bloodstock and its performances, and soon there will be, we hope, a sudden surging of interest. A question that may now be asked is whether the period of suspense has been used to the greatest advantage: first, in reflecting upon the history of bloodstock performance; and, secondly, in ascertaining whether advantage should be taken of the present situation to ordain some drastic alteration and ensure closer conformity with the indications of biological sciences, so as to attain still greater constitutional vigour and performance in the stock.

I need not dilate upon the nature of the disorders that are likely to arise through departure from the natural demands of the organism for healthy metabolism and that have been made abundantly clear to us; their meaning to the practical breeder can be assessed. I ventured to touch upon these relevancies in the discussion on Livestock Improvement at the recent annual general meeting of the N.V.M.A. (see *V.R.* 1943, November 6th), apropos bovine infertility.

At this latitude and in this climate, the equine organism artificially deflected to procreate offspring, for numerous successive generations, before January 1st—that is, much earlier than when Nature herself yearly undergoes regeneration—becomes subjected to multiple "insults." These are sooner or later manifested in osteodystrophic, neuro-motor and reproductive (infertility) disturbances, which can be only partially safeguarded against by certain careful adjustments such as supplemented diets, artificial sunlight, etc.

It is recognised that powerful interests in the bloodstock industry, with long and special experience of its needs have to be considered, but, in the interests of the thoroughbred race itself, one may question whether any insuperable obstacle persists that need deny to it the postponement of the foaling registration date from January 1st to May 1st. Perhaps, if that could be secured the desirable qualities of the breed's Arabian ancestors, which are not remote from the standpoint of evolutionary history, could be regained.

Yours truly,

The Yews, J. T. Edwards.
High Road,
Byfleet, Surrey.
November 12th, 1943.

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"A PROBLEM IN RESEARCH FOR HELMINTHOLOGISTS?"

Sir,—May I suggest the following as an answer to Professor Hugh Begg's enquiry in the issue of *The Veterinary Record* of October 30th.

(*a*) Since the larvae are motile and not firmly adherent to the ingested food they may migrate from the grasses, etc., to the more fluid rumen contents after ingestion and before rumination.

(*b*) Although the trituration of the food by the process of rumination is expected to be fine, as a fact, with sheep, many particles of food at least 5 mm. long escape the grinding process, whilst with cattle pieces of grass, hay, etc., up to ½ in. are regularly passed in the dung. It is obvious, therefore, that eggs 0·1 mm. long and infective larvae 0·5 mm. long may easily escape the destruction hoped for by Professor Begg.

Yours faithfully,

W. P. Blount.

Weekly Wisdom

Learning is, in too many cases, but a foil to common sense; a substitute for true knowledge. . . . The bookworm wraps himself up in his web of verbal generalities, and sees only the glimmering shadows of things reflected from the minds of others. Nature puts him out. *The impressions of real objects, stripped of the disguises of words and voluminous roundabout descriptions, are blows that stagger him.*—William Hazlitt, "On the Ignorance of the Learned."

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